

**Coluccio, Tina (DEQ)**

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**From:** Maki, Joe (DEQ)  
**Sent:** Wednesday, January 13, 2010 11:39 AM  
**To:** Coluccio, Tina (DEQ)  
**Subject:** FW: Humboldt - Response to Comments  
  
**Attachments:** humboldt RESPONSES TO PUBLIC COMMENTS.doc



humboldt  
PONSES TO PUBLIC  
Tina, for Humboldt file

-----Original Message-----

**From:** Thomas, Chuck (DEQ)  
**Sent:** Wednesday, January 13, 2010 11:15 AM  
**To:** Maki, Joe (DEQ)  
**Cc:** Humphrey, Melanie (DEQ)  
**Subject:** Humboldt - Response to Comments

Attached are proposed responses to the 22 public comments you gave me to consider.

Chuck Thomas  
Ground Water Engineer  
Water Bureau, MDEQ  
Upper Peninsula District Office  
Phone: 906-346-8534

**RESPONSES TO PUBLIC COMMENTS**  
**PROPOSED HUMBOLDT MILL MINE PERMIT**

1. **Comment:** The application and permits scratch the surface of hydrogeologic features and problems, but then just ignore them. For example, the application states that the site is underlain with "weakly jointed bedrock formation" with dikes and sills and faults and that "the deformation and foliation of these rocks has served to produce a weakly jointed bedrock surface." MPA Vol. I, Appendix B. Yet, the application and permits do not discuss if or how water moves through the faults and joints. Every discussion of hydrogeology is inconclusive and qualified.

**Response:** The MDEQ is unsure of which portion of the Mining Permit Application the commenter is referring to. MPA, Vol. I does not contain an Appendix B. MPA, Vol. II does contain an Appendix B and does make a general statement similar to the quote that the commenter has taken out of context. The quoted reference from Appendix B, specifically the third paragraph of Section 2.2 of the "Humboldt Mill Hydrogeological Report" speaks about the general bedrock geology of the overall region. The fourth and fifth paragraphs of the same section talk about the specific bedrock stratigraphy of the Humboldt Pit location.

The MDEQ maintains that when taken as a whole, the original permit application along with the information the applicant subsequently provided responsive to MDEQ comments, the bedrock hydrogeology is adequately described. The documents as a whole provide enough credible information for the Department to propose issuing a conditioned Part 632 permit. We refer the reader to the permit application document sections listed below for bedrock hydrogeology and water conductance information.

- The entire part of Section 2 of "Humboldt Mill Hydrogeological Report" – Appendix B of MPA, Vol. II, along with the accompanying figures.
- Selected portions of the December 2008 Humboldt Mill "Bedrock Hydrogeological Characterization Report" prepared by North Jackson Company.
- "Humboldt Pit Hydrogeological Report" prepared by Traverse Engineering Services, P.C. in 1984 for Callahan Mining Corporation.
- "Humboldt Mill Basin Integrity and Vertical Stability of the Humboldt Tailings Disposal Facility"; specifically:
  - Section 2.2, Water Balance,
  - Section 2.3, Abandoned Humboldt Mine Rate of Flooding,
  - Section 2.4 HTDF Geology and Hydrogeology,
  - Section 2.5 HTDF Bedrock Joint Assessment and Modeling, and
  - Section 2.7 2008 Bedrock Hydrogeological Characterization near the HTDF.
- April 23, 2009 Technical Memorandum prepared by North Jackson Company and provided to the MDEQ as a subsequent submittal to the applicant's February 2009 response document to the MDEQ Comments.

2. **Comment:** The application includes only limited hydrogeologic information collected in the vicinity of the Lake. There is not enough information to assess impacts to surrounding ground and surface waters, especially given the complexities at the site. According to the application:

- The Lake created a local cone of depression to its north and south. Yet, the application predicts that once the Lake is static, it will discharge to north. Surface recharge is reportedly from the east and west flanks of the Lake, while ground water recharge is from the south of the pit. The Lake discharges through subsurface and surface seeps at its north face and drains northward to the Middle Branch of the Escanaba River.

- Depth to ground water varies from less than 10 ft below ground surface east of the mill building to greater than 30 ft near the Lake. Ground water flow at the mill is to the west and south-west and enters the Black River.

**Response:** The MDEQ believes enough information has been gathered to make an informed decision about a conditioned Part 632 permit. See the MDEQ response to Comment 1.

3. **Comment:** Despite the complexities, only 2 groundwater compliance wells are placed for the whole facility, and both of these are at north of the Lake. Fig 5-1, MPA Vol. I. Given the faults and joints in the underlying bedrock and ground water flow regime's complexity, this is not adequate. There appear to be only 5 ground water wells total (for compliance and monitoring combined) for the whole site.

**Response:** The MDEQ is not sure which section of the Humboldt Mill facility the commenter refers to; the HTDF or the surface mill building area, so both locations are addressed. Including the multiple wells at cluster well points, the proposed Part 632 permit, specifically conditions J-4 through J-9 require the applicant to monitor ground water quality at 13 locations around the HTDF.

Once the final locations of all potential contaminant sources are determined, the applicant must submit a mill area monitoring plan for MDEQ approval in accordance with proposed permit condition J-11. The submitted plan must include more monitoring locations than just the two identified in the permit application documents, and must address monitoring on both sides of the local ground water divide present at the mill site.

4. **Comment:** The EIA mentions an "inference" with ground water flow direction near the Lake and "apparent" impacts and that there "appears to be a restriction of ground water flow" near the Lake. All of the qualifiers add up to show that Kennecott does not fully understand the ground water regime at the site. Therefore, the impacts from changes cannot be and have not been adequately addressed in the application.

**Response:** Since the comment failed to adequately cite what section of the EIA they found the purported qualifiers, it is difficult to respond directly to their issue. However, the MDEQ believes the applicant has adequately studied and has a sufficient understanding of the ground water regime around the HTDF. The preponderance of studies and data found throughout the MPA documents as detailed in the MDEQ response to comment 1 above exemplify that knowledge.

5. **Comment:** Groundwater inflow to the HTDF has been estimated, not measured. Inflow is a measurable parameter and real data should be used. MPA, Vol. I, App. D, p. 3

**Response:** The applicant used long-established and routinely accepted hydrogeologic methods to determine ground water flow into the HTDF. It is not reasonably feasible or necessary to directly measure the total ground water flow into a multiple-acre sized surface water body.

6. **Comment:** There is an absence of test wells to determine area surface and subsurface water character and conductivity as well as the complexity of gradient flow tendency. How can specific monitoring be considered accurate (representative of the affected area) without prior historical ground water data.

**Response:** The MDEQ cannot determine if this comment refers to the HTDF or the mill area. Regardless, we believe there is enough data to adequately determine the existing ground water gradients and ground water quality prior to the applicant's potential future operations in both areas. The commenter is referred to the multiple hydrogeologic studies contained in the MPA documents, many of which are identified in our response to comment 1 above. For historical ground water quality data we refer the commenter to MPA, Vol. IIB, Appendix A-2.

7. **Comment:** Hydrologic Monitoring Well Design needs to be part of application - Violates Part 632 statute and rules. This has not been done - therefore the application is not complete and the permit should not be granted.

**Response:** The permit application does contain well design information. The information is found in MPA, Vol. IIC, Appendix C-1 and Appendix C-2.

8. **Comment:** The structural geology surrounding the majority of the disposal lake remains an unknown.

**Response:** This comment duplicates comment 1 above. Our response is the same.

9. **Comment:** More specifically, neither the east nor west sides of the disposal lake have received even preliminary investigations. KEMC regularly drills thousands of feet a year of cored boreholes in bedrock for mineral exploration. Yet, KEMC has not, apparently will not, drill boreholes to acquire basic bedrock information in the immediate area surrounding the disposal lake, information that has significant bearing on the viability of the disposal lake to contain the dissolved metals which have resulted and will continue to result from the disposal of metal sulfide minerals into the lake. A series of 45 degree angle borings around the disposal lake would yield considerable relevant information. However, the MDEQ must require that KEMC provide the requisite structural geology information needed to make the assertion that these are "aquitards and aquicludes".

**Response:** The MDEQ believes that a detailed study as suggested by the commenter is unnecessary based on three pieces of specific information contained in the application and comment response documents. The information supporting the MDEQ position is 1) the detailed study of bedrock fracture and bedding plane interconnectivity performed by Rod Johnson Associates, 2) the multiple water balance and pit filling studies included in the application, and 3) the bedrock piezometric surface and resultant ground water gradient information submitted responsive to the MDEQ comments on the original application.

10. **Comment:** The Community has previously noted (comments submitted to the MDEQ March 2009) the lack of structural geology maps, logs of bedrock borings or cross-sections based on borings and field mapping for the bedrock immediately adjacent to the proposed disposal lake. There is no discussion of the geologic maps, cross sections or records from the former Humboldt Iron Mine. KEMC's attempts to respond to accusations that they have not done their homework fall short of meeting the bedrock characterization requirements.

**Response:** The MDEQ believes the preponderance of data and information presented in the original application and the subsequent response documents to MDEQ comments adequately meet the Part 632 Statute and Rules and allow the MDEQ to make an informed decision on a conditioned permit.

**NOTE:** Comments 11 through 16 refer to a document KEMC provided to the EPA. The MDEQ has not received that document, and it is not part of the documents the MDEQ is relying upon to make a decision about issuing a conditioned Part 632 permit for the Humboldt Mill. Thus, we are unable to respond to the submitted comments.

17. **Comment:** The foregoing discussion of the inadequacies of the Humboldt site geotechnical investigations and the questions arising from the lack of essential information indicate that the MDEQ is not, should not, be ready to issue permits for the operation of the Humboldt Mill and disposal lake. The Community remains insistent that this easily obtainable information be gathered and analyzed before such important decisions are made by the MDEQ.

**Response:** MDEQ believes the applicant has provided adequate hydrogeologic and required geotechnical information for the MDEQ to make an informed decision on a conditioned Part 632 permit. We refer the commenter to the entire Humboldt Mill application document set reviewed by the MDEQ, and not to the KEMC communication to the USEPA, which is not part of the decision-making process.

18. **Comment:** Has Kennecott proven, beyond a doubt, that the tailings pit will not leak? If not, the application is incomplete. Is the DEQ aware that, contrary to Kennecott's assurances, the pit area is made up of bedrock fractured both naturally and by heavy blasting and that there are gaps in the supposedly impervious clay layer? And does the DEQ realize that similar, false claims were made by Kennecott regarding the Flambeau mine? That pit water has passed through the "slurry wall" between pit and river?

**Response:** The MDEQ believes that the applicant has provided adequate information for the MDEQ to determine if granting the permit would lead to an unacceptable environmental impact or not. While no one can say that water will never leave the pit via tiny fractures in the bedrock surrounding the pit, the hydraulic conductivity of the bedrock and the ground water gradients surrounding the HTDF indicate there would likely be no unacceptable impact to receptors of concern. The MDEQ is aware of bedrock fractures surrounding the pit, and believes the applicant identified those fractures. The permit application portion titled "Humboldt Mill Basin Integrity and Vertical Stability of the Humboldt Tailings Disposal Facility" contains a detailed description of pit wall bedrock fractures and joints and the investigations that led to the bedrock fracture conclusions.

19. **Comment:** Do you have data and scientific evidence that the water will not leak from the pit? If so, could you please share with the public the evidence showing the geology of the pit and why it is that water comes into the pit, but does not leave the pit?

**Response:** Currently water enters the pit (HTDF) from four sources: rainfall direct to the water surface, rainfall runoff from the south, east, and west sides of the HTDF, ground water flow from the unconsolidated aquifer at the HTDF south end, and small amounts of ground water flow through the HTDF west and east side bedrock walls. At the present time, water exits the HTDF north end via the unconsolidated aquifer ground water flow and seepage channels into the adjacent wetland. Once the slurry wall is constructed, the north end ground water and seepage flows will be eliminated. The HTDF hydraulic head will not significantly change as the applicant intends to maintain a water level very near current levels during operations. The water level will be maintained by pumping water from the pit, treating the water if necessary, and discharging the water directly to the north wetland via a NPDES permitted outfall. As long as the HTDF water hydraulic head does not increase beyond a certain point, which is established in the permit application documents, the hydraulic gradients from the south, east, and west will remain towards the HTDF. This will stop water from flowing out the HTDF in those directions. There will be hydraulic pressure exerted on the slurry wall at the HTDF north end. As long as the slurry wall functions as designed, water will be held in the HTDF. The water balance will be maintained by the pump and discharge system mentioned above.

Together, the permit application and applicant response to MDEQ comments documents contain the hydrogeologic, water balance, and bedrock characterization evidence needed to adequately ascertain that the HTDF will not leak significant amounts of water.

20. **Comment:** Are there enough groundwater compliance wells and are they placed appropriately? If you take a good look at Kennecott's Flambeau Mine, you will see that the company is very good at conveniently placing compliance zones and monitoring wells.

**Response:** The MDEQ believes there will be enough wells to adequately monitor the operations of both the HTDF and the mill site once the additional wells required by the proposed permit conditions are installed. Placement of monitoring wells has not been solely left to the applicant's discretion. The MDEQ has prescribed the location and depth of many of the eventual wells that will be used for compliance monitoring.

21. **Comment:** Why is it that in Kennecott's drawings of the Pit cross-sections they exaggerated the vertical scale by a factor of 10:1 to make the sides of the pit look MUCH steeper than they really are. Was it to enhance a perception that upper and lower waters are less likely to mix? If so that is willful deception.

**Response:** Vertical exaggeration is a common practice for cross-section diagrams. Experienced engineers and scientists, such as the MDEQ staff are very capable of deciphering the actual situation based on a vertically exaggerated diagram.

22. **Comment:** Section F(12) indicates that if structural defects are found in the containment wall, it shall be stabilized "by adding fill to bolster the dike." That requirement does not go nearly far enough. If the wall has structural deficiencies, inflow to the HTDF should be halted immediately and suspended until MDEQ or a third party inspects and approves the



wall's efficacy and long-term solutions are implemented. Just plugging the hole and hoping for the best are not good enough

**Response:** Proposed permit condition F-12 is not a stand-alone condition. Condition F-12 along with conditions F-9, F-10, and F-11 provide sufficient performance criteria to ensure that the containment wall functions as required. Further, the proposed permit conditions should minimize the possibility of an adverse environmental impact due to the HTDF operation. The MDEQ believes it has the tools in place with the proposed permit conditions and staff expertise to assess if the containment wall is functioning as designed and does not believe it will be necessary for a third-party review and approval of repairs.